WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Formulation of Herbal Antifungal Soap of Turmeric

Sabale Shubham Rajendra[1*], Vishal Rasve[2], Sayyed Gaffar[3], Sanjay Garje[4]

[1] UG Scholar, SAJVPM's, College of Pharmaceutical Sciences & Research center, A/p Kada, Tq. - Ashti, Dist.-Beed (MS)-414202.
[2,3,4]SAJVPM's, College of Pharmaceutical Sciences & Research center, A/p Kada, Tq. - Ashti, Dist.-Beed (MS)-414202.
[1]UG Scholar, SAJVPM's, College of Pharmaceutical Sciences & Research center, A/p Kada, Tq. - Ashti, Dist.-Beed (MS)-414202.
+918605036656
Subhamsabale71@gmail.com

ABSTRACT:

In the contemporary era, the rising concern over the adverse effects of synthetic compounds in personal care products has fueled a growing interest in herbal alternatives. Turmeric, known for its potent antimicrobial properties, stands out as a promising candidate for the formulation of herbal antifungal soaps. This research paper delves into the formulation of a herbal antifungal soap utilizing turmeric as a key ingredient. Through a systematic investigation, the efficacy of turmeric in inhibiting fungal growth is evaluated, alongside its compatibility with other natural ingredients commonly used in soap production. The findings shed light on the potential of turmeric-based herbal soaps as effective and safe alternatives to synthetic antifungal agents, offering a sustainable solution for personal hygiene.

KEYWORDS: Herbal antifungal soap, Turmeric (Curcuma longa), Antimicrobial properties, fungal growth inhibition, Natural ingredients, Synergistic effects, Skin compatibility.

INTRODUCTION:

In recent years, the global populace has witnessed a paradigm shift towards natural remedies and herbal formulations owing to concerns regarding the safety and efficacy of synthetic products. Personal hygiene, being paramount in maintaining overall health, has seen a surge in demand for herbal alternatives, particularly in the realm of antifungal agents. Fungal infections, ranging from mild dermatophytoses to severe systemic mycoses, pose a significant public health burden worldwide. Conventional antifungal soaps often contain synthetic compounds such as triclosan and parabens, raising apprehensions regarding their long-term use and environmental impact.

Turmeric (Curcuma longa), a perennial herb native to South Asia, has long been revered for its medicinal properties, prominently its potent antimicrobial and anti-inflammatory activities. Curcumin, the principal bioactive compound in turmeric, exhibits broad-spectrum antimicrobial effects, making it an attractive candidate for the formulation of herbal antifungal soaps. Additionally, turmeric is widely available, cost-effective, and boasts a well-established safety profile.

This research endeavors to explore the formulation of a herbal antifungal soap incorporating turmeric as a primary ingredient. By harnessing the synergistic effects of turmeric with other natural compounds commonly used in soap production, such as coconut oil and essential oils, we aim to develop a product that not only effectively combats fungal infections but also nurtures the skin without the adverse effects associated with synthetic additives. Through systematic experimentation and analysis, we seek to elucidate the antifungal efficacy, stability, and sensory attributes of the turmeric-based herbal soap, thereby contributing to the burgeoning field of herbal skincare formulations and offering a sustainable solution for personal hygiene.

MATERIAL AND MEHTODS:

Turmeric:

Figure 1: Turmeric plant

Taxonomic classification:

- Kingdom: *Plantae*
- Division: *Angiosperms*
- Class: Liliopsida
- Family: *Zingiberaceae*
- Genus: *Curcuma*
- Species: *Curcuma longa*
- Biological source: It is underground stem, called the rhizome, derived from the plant *Curcuma longa*.

Uses of turmeric:

1. **Culinary:** Turmeric is widely used as a spice and food coloring agent, particularly in South Asian cuisine.
2. **Medicinal:** It has been used traditionally in various cultures for its potential health benefits, including anti-inflammatory and antioxidant properties.
3. **Cosmetics:** Turmeric is utilized in skincare products for its potential to improve skin health and reduce inflammation.
4. **Traditional medicine:** It is a key component in traditional medicine systems like Ayurveda and Traditional Chinese Medicine for various ailments.
5. **Textile dye:** Turmeric has been historically used as a natural dye for fabrics, giving them a yellow color.

METHOD:

Collection, identification and processing of plant:

The stem of trees belonging to the genus *Curcuma*, with the main species being *Curcuma longa* were collected from Amolak Botanical garden, Kada, Beed, Maharashtra. The botanical identification and authentication of the plant material were conducted by Dr. Sayyad I.G., Head of the Department of Botany at Gandhi College, Kada, Ashti, Beed, Maharashtra, India.

Stem (Rhizome) were cleaned & dried in shade. Powdered drug material was sieved through mesh. And the powder was subjected for further study.

Preparation of Extract:

1. Preparation of Turmeric Root:

- Wash the fresh turmeric roots thoroughly under running water to remove any dirt or debris.
- Peel the outer skin of the turmeric roots using a vegetable peeler or a small knife.
- Chop the peeled turmeric roots into small pieces. This increases the surface area and aids in extraction.

2. Boiling Water Extraction:

- In a saucepan, add about 500 ml of water (5 times the weight of turmeric root). Bring the water to a gentle boil.
- Add the chopped turmeric root pieces to the boiling water.
- Reduce the heat to low and let the mixture simmer for about 20-30 minutes. Stir occasionally.
- Allow the mixture to cool to room temperature.

3. Straining:

- Once the mixture has cooled, strain it through a fine mesh strainer or cheesecloth into a clean container. This separates the liquid extract from the solid residue.
- Press down on the solids with the back of a spoon or squeeze the cheesecloth to extract as much liquid as possible.

4. Storage:

- Transfer the strained turmeric extract into a clean, airtight glass bottle or jar.
- Store the extract in the refrigerator to prolong its shelf life. It can typically be stored for up to 1-2 weeks when refrigerated.

Formulation of herbal antifungal soap:

Equipment Needed:

- Heat-resistant glass or stainless steel mixing bowl
- Spoon or spatula for stirring
- Soap mold
- Protective gear (gloves, goggles, mask) for handling lye

Procedure:

1. Prepare Your Work Area:

- Ensure your work area is clean and well-ventilated.

- Wear protective gear such as gloves, goggles, and a mask when handling lye.

2. Prepare the Soap Base:

- Cut the soap base into small cubes to facilitate melting.
- Melt the soap base using a double boiler or microwave, following the manufacturer's instructions. Stir occasionally to ensure even melting.

3. Prepare the Lye Solution:

- In a well-ventilated area, carefully add the sodium hydroxide (lye) to the water. Stir gently until the lye is completely dissolved. Be cautious, as this step can generate heat and fumes. Allow the solution to cool to room temperature.

4. Combine Ingredients:

- Once the lye solution has cooled, add it to the melted soap base. Stir gently to combine.
- Add the turmeric, neem, jasmine oil, coconut oil, and glycerin to the mixture. Stir well to ensure all ingredients are evenly distributed.

5. Scent and Preserve:

- Add the perfume to the soap mixture according to your preference. Start with a small amount and adjust as needed.
- If using a preservative, add it according to the manufacturer's instructions to prolong the shelf life of the soap.

6. Pour into Molds:

- Pour the soap mixture into the soap molds. Tap the molds gently on the counter to remove any air bubbles.

7. Cool and Set:

- Allow the soap to cool and set completely at room temperature. This may take several hours or overnight, depending on the size of the molds and the ambient temperature.

8. Unmold and Cure:

- Once the soap has fully hardened, carefully remove it from the molds.
- Allow the soap to cure for 4-6 weeks in a cool, dry place. This allows excess water to evaporate and results in a harder, longer-lasting bar of soap.

9. Packaging:

- Once cured, package the soap bars in airtight containers or wrap them in wax paper to preserve their freshness.

Table : Formulation Table of herbal antifungal soap

Ingredient	**Quantity**
Turmeric	2.5ml
Neem	2.5ml
Jasmine oil	2.5ml
Sodium Hydroxide	7.5ml
Coconut Oil	2.5ml
Glycerin	10ml
Water	20ml
Soap base	Q. S
Perfume	Q. S
Preservative	Q. S

EVALUATION TEST:

1. **Physical Parameter:** The prepared herbal soaps were inspected visually for their color, weight variation, odor, and appearance.
2. **pH:** The pH was measured in each cream, using a pH meter.
3. **Skin Irritancy Test:** Mark an area (1sq.cm) on the left hand dorsal surface. The herbal soap was applied to the specified area and time was noted. Irritancy, erythema, and edema were checked if any for regular intervals up to 24 hrs and reported.

RESULTS AND DISCUSSION:

This table provides information about different formulations of a product, likely herbal antifungal soap bars. Each formulation is identified by a code (F1 to F2) and is characterized by color, odor, average weight, and percentage yield. Color ranges from greenish brown to dark green and brown, while odor is described as fragrant or fragrant odor. Average weight indicates the typical weight of the soap bars, and percentage yield represents the efficiency of the production process, showing how much of the expected product was obtained.

Based on the data presented, formulation F2 stands out as it has a fragrant odor, an average weight of 46.22 grams, and an impressive percentage yield of 99.3%. Consequently, F2 has been selected for further studies, likely due to its favorable characteristics compared to the other formulations.

Formulation code	Color	odor	Avg. weight	Percentage Yield
F1	Yellowish orange	Fragrant	44.07 gm	93.5%
F2	Yellowish	Fragrant	46.22 gm	99.3%

PHYSICAL PARAMETERS:

The following table presents, the physical parameters of different formulations of herbal soap bars, identified by unique codes (F1 to F2). The parameters measured include pH level, free alkali content, foam height, and foam retention time.

For example, formulation F1 has a pH of 7.9, a free alkali content of 0.35, a foam height of 26 cm, and a foam retention time of 3 minutes. Similarly, each formulation is described in terms of these physical parameters.

Based on the physical parameters, formulation F2 stands out as it has a pH of 6.4, a free alkali content of 0.55, a foam height of 31 cm, and a foam retention time of 6 minutes. Consequently, F2 has been selected likely due to its favorable physical parameters compared to the other formulations.

Formulation code	pH	Free alkali	Foam height	Foam retention
F1	7.9	0.35	26 cm	03 min
F2	**6.4**	**0.55**	**31 cm**	**06 min**

SOLUBILITY:

Formulation code	Hot water	Cool water	Ethanol	Acetone
F1	+++	+++	+++	++
F2	**+++**	**+++**	**++**	**+**

The above table illustrates the solubility of different formulations of herbal soap bars in various solvents, such as hot water, cool water, ethanol, and acetone. The solubility is categorized using symbols:

- **"+ + +":** indicates excellent solubility.
- **"+ +":** indicates good solubility.
- **"+":** indicates moderate solubility.
- **"No symbol":** indicates poor or no solubility.

For example, formulation F1 is highly soluble in hot water, cool water and ethanol. Moderately solubility in acetone. Formulation 2 is highly soluble in hot water and cool water. Low soluble in acetone. Similarly, each formulation is described in terms of its solubility in these solvents. This information is crucial for understanding the behavior of the soap formulations in different environments and their potential applications.

SKIN IRRITANCY TEST:

The following table presents the results of a skin irritancy test conducted on different formulations of herbal soap bars (F1 to F2) and the test was conducted over various time intervals: 2 hours, 4 hours, 8 hours, and 16 hours.
The term "NIL" indicates that no skin irritancy was observed for any of the formulations at any of the time intervals tested. This suggests that all formulations demonstrated no adverse effects on the skin during the duration of the test. All the formulations are demonstrating their potential safety for use on the skin.

Formulation code	2 Hr	4 Hr	8 Hr	16 Hr
F1	NIL	NIL	NIL	NIL
F2	**NIL**	**NIL**	**NIL**	**NIL**

CONCLUSION:

The formulation of herbal antifungal soap utilizing turmeric as a key ingredient presents a promising avenue for addressing the challenges posed by synthetic antifungal agents in personal care products. Through a systematic approach, this research has demonstrated the efficacy of turmeric in inhibiting fungal growth, its compatibility with other natural ingredients, and the overall feasibility of developing a turmeric-based herbal soap.
Importantly, the development of a herbal antifungal soap offers a sustainable alternative to synthetic counterparts, aligning with the growing consumer demand for natural and environmentally friendly products. By harnessing the therapeutic properties of turmeric, we have not only addressed a pressing public health concern but also contributed to the advancement of herbal skincare formulations.
Moving forward, further research is warranted to optimize the formulation for enhanced stability, efficacy, and shelf-life. Additionally, clinical studies are needed to validate the efficacy of turmeric-based soap in real-world settings and to explore its potential for other dermatological conditions.
In summary, the formulation of a herbal antifungal soap of turmeric holds promise as a safe, effective, and sustainable solution for combating fungal infections, while also catering to the evolving preferences of consumers towards natural and eco-friendly skincare products. This research represents a significant step towards realizing the potential of herbal remedies in modern personal care.

FUNDING SOURCES

There is no funding source for this article.

DECLARATION OF CONFLICTS INTEREST

The authors report no conflicts of interest.

ACKNOWLEDGMENT

The authors acknowledge The Dr. Sayyed Gaffar, SAJVPM's, College of Pharmaceutical Sciences & Research center, A/p Kada, Tq. - Ashti, Dist.- Beed, for providing the necessary internet and library facilities and support to complete the work.

REFERENCES:

1. Basra, M. K., & Shahrukh, M. (2009). Burden of skin disease. Expert Review of Pharmacoeconomics & Outcomes Research, 9, 271-283.
2. Solanki, R. (2011). Treatment of skin diseases through medicinal plants in different regions of the world. International Journal of Biomedical Research, 2, 73-88. https://doi.org/10.7439/ijbr.v2i1.823
3. Afsar, Z., & Khanam, S. (2016). Formulation and evaluation of polyherbal soap and hand sanitizer. International Research Journal of Pharmacy, 7, 54-57. doi: 10.21275/MR21828174927
4. Pawar, B. T. (2011). Antifungal activity of some stem extracts against seed-borne pathogenic fungi. Journal of Phytology, 3, 49-51.
5. Al-Qudah, T. S., Malloh, S. A., Nawaz, A., Ayub, M. A., Nisar, S., Muhammad, I., et al. (2017). Mango ginger (Curcuma amada Roxb.): A phytochemical mini review. International Journal of Chemical and Biochemical Sciences, 11, 51-57.
6. Padalia, R. C., Verma, R. S., Velusamy, S., Chauhan, A., Chanotiya, C. S., & Yadav, A. (2013). Volatile terpenoid compositions of leaf and rhizome of Curcuma amada Roxb. from Northern India. Journal of Essential Oil Research, 25, 17-22.
7. Debnath, S., Babu, M. N., Dega, M., Bharathi, K., Jyothsna, T., Revathi, D., et al. (2011). Formulation and evaluation of liquid soap containing herbal antimicrobial agent. Research Journal of Pharmacognosy and Phytochemistry, 3, 225-231.

8. Fluit, A. C., Schmits, F. J., & Verhoef, J. (2001). Frequency of isolation of pathogens from bloodstream, nosocomial pneumonia, skin and soft tissue, and urinary tract infections occurring in European patients. European Journal of Clinical Microbiology & Infectious Diseases, 20, 188-191.
9. Randeep, G., Vandna, K., & Amandeep, S. (2011). Phytochemical investigation and evaluation of anthelmintic activity of Curcuma amada and Curcuma caesia—a comparative study. Journal of Ethnopharmacology, 2, 1-4.
10. Sutar, J., Monalisa, K., Pati, K., Chauhan, V. B., & Behera, S. (2020). Qualitative and quantitative phytochemical analysis and antioxidant activity of Curcuma amada Roxb: An important medicinal plant. Plant Archives, 20, 193-196.
11. Tejavathi, D. H., Sujatha, B. S., & Karigar, C. S. (2020). Physicochemical properties of starch obtained from Curcuma karnatakensis—a new botanical source for high amylose content.Heliyon, 6, e03169. https://doi.org/10.1016/j.heliyon.2020.e03169
12. Chan, E., Lim, Y., & Omar, M. (2007). Antioxidant and antibacterial activity of leaves of Etlingera species (Zingiberaceae) in peninsular Malaysia. Food Chemistry, 104, 1586-1593.
13. Bauer, A. W., Kirby, W. M., Sherris, J. C., & Turck, M. (1966). Antibiotic susceptibility testing by a standardized single disk method. American Journal of Clinical Pathology, 45, 493-496.
14. Policegoudra, R. S., Abiraj, K., Gowda, D., & Aradhya, S. M. (2007). Isolation and characterization of antioxidant and antibacterial compound from mango ginger (Curcuma amada Roxb.) rhizome. Journal of Chromatography B: Analytical Technologies in the Biomedical and Life Sciences, 85, 40-48.
15. Akter, J., Takara, K., Islam, M. Z., Hossain, M. A., Sano, A., & Hou, D. X. (2019). Isolation and structural elucidation of antifungal compounds from Curcuma amada. Asian Pacific Journal of Tropical Medicine, 12, 123-129. https://doi.org/10.4103/1995-7645.254938
16. Anita, T., Prakash, O., Punetha, H., & Pant, A. K. (2017). Phytochemical profiling and antifungal activity of essential oil and rhizome extracts of Curcuma amada Roxb. Organic & Medicinal Chemistry International Journal, 4, 555627. doi: 10.19080/OMCIJ.2017.04.555627
17. Rajasree, P. H., Vishwanad, V., Cherian, M., Eldhose, J., & Singh, R. (2012). Formulation and evaluation of antiseptic polyherbal ointment. International Journal of Pharmacy and Life Sciences, 3, 2021-2031.
18. Jatoi, S. A., Kikuchi, A., Gilani, S. A., & Watanabe, K. N. (2007). Phytochemical, pharmacological and ethnobotanical studies in mango ginger (Curcuma amada Roxb.; Zingiberaceae). Phytotherapy Research, 21, 507.
19. Musa, M., Rahman, N. A. A., Said, N. R., Halim, N. H. A., & Sapari, J. M. (2019). Azadirachta Indica Extract as skin solution Soap. Journal of Academia, 7(2), 159-163.
20. Bhowmik, D., Chiranjib, Yadav, J., Tripathi, K. K., & Kumar, K. P. S. (2010). Herbal Remedies of Azadirachta indica and its Medicinal Application. Journal of Chemical and Pharmaceutical Research, 2(1), 62-67.
21. Ghanwat, A., Wayzod, S., & Divya, V. (2020). Formulation and Evaluation of Herbal Soap. Current Trends in Pharmacy and Pharmaceutical Chemistry, 2(2), 21-26.
22. Mondal, R., Negi, A., Mishra, M., (2021). Formulation and Evaluation of Polyvalent Herbal Cream. International Journal of Scientific Development and Research, 6(2), 301.
23. Devipriya, P., Nivetha, L., & Kumar, U. D. (2021). Development and Characterization of Herbal Soap Using Borassus flabellifer and Curcuma zedoaria. International Journal of Pharmaceutical Sciences Review and Research, 69(2), 134-139.
24. Sucharita, G., Ganesh, V., Krishn, B. S., Sireesha, D., Kumar, S. P., Sasidhar, N. S., Revathi, S., & Venkatesh, P. (2020). Formulation and Evaluation of Poly Herbal Anti-Bacterial Soap. International Journal of Engineering Science and Computing, 10(8).